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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB). first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, then combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

ED 059305

TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

PACKER, TEA BAG 9-68.01

B-247 or S-29

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EDUCATION,& WELFARE
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GATB #688
March 1952

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY FOR PACKER, TEA BAG 9-68.01

S-29

Summary

The entire GATB, except Part E, was administered to 57 female workers employed as Packer, Tea Bag 9-68.01 by the Lipton Tea Company, Galveston, Texas. The criterion used consisted of the composite ratings of the plant manager, personnel officer, and foreman. The aptitudes found to be significant for this occupation are Aiming, Motor Speed, and Finger Dexterity.

GATB Norms for Packer, Tea Bag 9-68.01 S-29

Table I shows the minimum acceptable score for each aptitude included in the test norms for Packer, Tea Bag 9-68.01.

TABLE I

Minimum Acceptable Scores for S-1001

Aptitude	Tests	Minimum Acceptable Aptitude Score
A	CB-1-C CB-1-K	80
T	CB-1-G CB-1-K	90
F	CB-1-O CB-1-P	80

Effectiveness of Norms

The data in Table V indicate that 10 of the 14 poor workers, or 71% of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 71% of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 31 of the 35 workers who made qualifying test scores, or 89%, were good workers.

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TECHNICAL REPORT

I. Problem

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Packer, Tea Bag 9-68.01.

II. Sample

The entire GATB, except Part E, was administered to 57 female workers employed as Packer, Tea Bag, 9-68.01 by the Lipton Tea Company, Galveston, Texas. The GATB was administered prior to the 57 workers' employment by the Lipton Tea Company. The test results were not used in the selection of the applicants. Management stated that the training time for this job was 60 days. Management imported experienced operators from the other six plants in the country to train and supervise the workers during the training period, as this was a new plant in the process of being staffed.

Table II shows the means, standard deviations, ranges, Pearson product-moment correlations (corrected for broad categories) with the criterion, and standard errors of correlation for age and education.

TABLE II

Means (M), Standard Deviations (σ), Ranges, Pearson Product-Moment Correlations (Corrected for Broad Categories) with the Criterion ($_{c}r$), and the Standard Errors of Correlation (σ_{cr}) for Age and Education

Packer, Tea Bag 9-68.01
N=57

	M	σ	Range	$_{c}r$	σ_{cr}
Age (years)	25.175	4.809	18-33	.166	.129
Education (years)	10.333	1.393	8-13	.000	.000

The above statistics indicate that this is a fairly homogeneous group. There appears to be no significant relationship between the criterion and age or education. None of the applicants were experienced workers. The learning time for the job as determined by company officials is only 60 days. None of the workers in the sample had more than 10 months of experience on the job at the time the ratings were made. All of them had been on the job longer than the 60-day learning period.

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III. Job Description

Packer, Tea Bag 9-68.01

Job Summary

Working with others as a team, packs a specified number of individual tea bags into an interliner bag, and packs a specified number of the interliner bags into cartons.

Work Performed

Packs individual tea bags into interliner bags: Receives instructions from foreman regarding number (3, 10, 16, 48, or 100) of individual bags to be packed into interliner bags. Receives tea bags from tea ball machine; visually counts specified number of bags; picks up the 8, 10, or 16 bags with one hand; picks up interliner bag with other hand and slides tea bags into interliner bag; folds top of interliner bag and places it on adjoining work area.

Packs interliner bags into cartons: Picks up precreased carton from conveyor belt; packs specified number of interliner bags into carton and places carton on an adjoining conveyor belt for final sealing by machine.

IV. Experimental Battery

All of the tests of the GATB, with the exception of Part B, were administered to the sample group.

V. Criterion

The criterion was based on ratings by the plant manager, personnel officer, and foreman. These ratings were combined into broad categories and quantitative values were computed. The choice of criterion was made because of lack of individual production records since the work is performed in groups and the workers often shift from one group to another.

VI. Statistical and Qualitative Analysis

Table III shows the means, standard deviations, Pearson product-moment correlations (corrected for broad categories) with the criterion, and the standard errors of correlation for the aptitudes of the GATB. Table IV shows the means, standard deviations, standardized means, standardized standard deviations, Pearson product-moment correlations (corrected for broad categories) with the criterion, and the standard errors of correlation for the aptitudes of the GATB. Table IV shows the means, standard deviations, standardized means, standardized standard deviations, Pearson product-moment correlations (corrected for broad categories) with the criterion, and standard errors of correlation for the tests of the GATB.

The means and standard deviations of the aptitudes and standardized means and standard deviations of the tests are comparable to general populati norms with a mean of 100 and a standard deviation of 20.

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TABLE III

Means (M), Standard Deviations (σ), Pearson Product-Moment Correlations (Corrected for Broad Categories) with the Criterion ($_{c}r$), and the Standard Errors of Correlation (σ_{cr}) for the Aptitudes of the GATB

Packer, Tea Bag 9-68.01
N=57

Aptitude	M	σ	$_{c}r$	σ_{cr}
G Intelligence	91.754	11.538	.195	.127
V Verbal Aptitude	90.772	13.591	.014	.132
N Numerical Aptitude	89.123	13.934	.148	.130
S Spatial Aptitude	98.246	16.708	.206	.127
P Form Perception	97.158	16.907	.132	.130
Q Clerical Perception	87.544	14.265	.187	.128
A Aiming	99.684	17.489	.262	.123
T Motor Speed	96.561	20.488	.302	.120
F Finger Dexterity	113.895	21.265	-.032	.132
M Manual Dexterity	107.421	16.485	.040	.132

TABLE IV

Means (M), Standard Deviations (σ), Standardized Means (M'), Standardized Standard Deviations (σ'), Pearson Product-Moment Correlations (Corrected for Broad Categories) with the Criterion ($_{c}r$) and Standard Errors of Correlation (σ_{cr}) for the Tests of the GATB

Packer, Tea Bag 9-68.01
N=57

Test	M	σ	M'	σ'	$_{c}r$	σ_{cr}
A Tool Matching	20.860	5.574	99	19	.133	.130
B Name Comparison	58.544	14.264	87	14	.187	.128
C H Markings	44.526	7.108	101	19	.158	.129
D Computation	22.526	6.035	89	16	.114	.131
F Two-Dimensional Space	20.772	6.232	95	15	.026	.132
G Speed	131.281	26.035	96	25	.249	.124
H Three-Dimensional Space	17.123	5.846	99	17	.221	.126
I Arithmetic Reason	7.158	1.989	91	12	.193	.127
J Vocabulary	16.631	6.282	91	14	.009	.132
K Mark Making	70.053	7.610	98	16	.321	.119
L Form Matching	24.649	5.411	96	14	.091	.131
M Place	90.649	7.554	106	17	.138	.130
N Turn	104.719	8.745	108	20	-.157	.129
O Assemble	30.842	5.046	114	22	-.049	.132
P Disassemble	30.579	3.802	109	21	.022	.132

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The statistical results were analyzed in the light of significant aptitude requirements as indicated in the job analysis. Aptitudes A, T, F, and M appear to have the greatest importance on this basis. Aptitude A is required in picking up and inserting tea bags manually using visual copy; aptitude T is required in order to work rapidly with sustained speed; aptitude F is required in handling tea bags and interliner bags; and aptitude M is required in picking up tea bags, interliner bags, and cartons, and in packing the bags and cartons.

Aptitudes F and M had the highest means for this sample. Both mean scores were above the general population mean of 100. Aptitudes A and T had correlations with the criterion which were significant at the 5% level.

Aptitudes A, T, F, and M, which show significance on the basis of the statistical results and on the basis of job analysis data, appeared to deserve further consideration. Aptitudes A, T and F were finally selected for inclusion in the test norms. Aptitude M was eliminated because it did not add to the predictive efficiency of the norms. The critical score for aptitude A was set one standard deviation below the mean and rounded to the nearest five-point level. The critical score for aptitude T was set at a higher level and the critical score for aptitude F was set at a lower level than one sigma below the mean in order to obtain better predictive value for the norms. Therefore, the recommended test norms consist of aptitudes A, T, and F with critical scores of 80, 90, and 80, respectively.

For the purpose of computing a tetrachoric correlation coefficient and Chi Square, the criterion was dichotomized between the middle and low efficiency groups. Table V shows the relationship between test norms consisting of aptitudes A, T, and F with critical scores of 80, 90, and 80, respectively and the criterion dichotomized into high and low efficiency groups for Packer, Tea Bag 9-68.01. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE V

Relationship Between Test Norms Consisting of Aptitudes A, T, and F with Critical Scores of 80, 90, and 80 Respectively, and the Critical Criterion Score of 50 for Packer, Tea Bag 9-68.01
N=57

	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	12	31	43
Poor Workers	10	4	14
Total	22	35	57

$r_{tet} = .63$
$\sigma_{r_{tet}} = .23$

$\chi^2 = 6.704$
$p/2 < .005$

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The data in Table V yielded a tetrachoric correlation coefficient of .63 with a standard error of .23 and a Chi Square of 6.704 which yields a p/2 value of less than .005, indicating good predictive value and a high degree of probability that the relationship between these norms and the criterion is significant.

Since Occupational Aptitude Pattern number 20 which consists of Aptitudes A, T, F, and M each with a minimum score of 85, is similar to the recommended norms, its predictive value for this sample was also determined. The tetrachoric correlation coefficient was found to be .45 with a standard error of .23. This shows that although the relationship between Occupational Aptitude Pattern 20 and the criterion approaches significance, the ratio of the tetrachoric correlation to its standard error is not quite high enough to be regarded as significant.

VII. Conclusions

On the basis of all the foregoing considerations, it is recommended that aptitudes A, T, and F with critical scores of 80, 90, and 80, respectively be used as test norms for the occupation of Packer, Tea Bag 9-68.01.